7.12 Interest Rate risk

Q104 Section 7.12 Should the IAIS consider employing the AFNS model for ICS Version 2.0? Please explain. If "no", please indicate if the IAIS should continue using the DNS model or suggest an alternative model to the DNS.

Organisation	Jurisdiction	Confidential	Answer	Answer Comments
China Banking and Insurance Regulatory Commission (CBIRC)	China	No	No	From the last two years' field testing results, the RMB shocks generated by the DNS model fluctuated a lot, and it is significantly changing the interest risk result but not clearly explainable. It looks like DNS is not stable and we are not sure if AFNS could improve on this aspect.
European Insurance and Occupational Pensions Authority (EIOPA)	EIOPA	No	No	No, we feel that the current DNS model is already a very sophisticated and hence a relative complex approach. The AFNS model seems to be even more complex. More fundamentally, we concur with the view expressed in the consultation document that arbitrage-free models are not necessarily suitable for capital requirement calculations as they are "risk neutral" models and not "real world" models. In line with this argument we doubt whether it's appropriate to include a mean reversion element in the calculation, and in particular to recognize potential gains under the mean reversion scenario. The normal approach in calculating stress-based capital requirement is to set potential gains under (sub)scenario's to 0.
Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)	Germany - BAFIN	No	No	No, we feel that the current DNS model is already a very sophisticated and hence a relative complex approach. The AFNS model seems to be even more complex. More fundamentally, we concur with the view expressed in the consultation document that arbitrage-free models are not necessarily suitable for capital requirement calculations as they are "risk neutral" models and not "real world" models. In line with this argument we doubt whether it's

				appropriate to include a mean reversion element in the calculation, and in particular to recognize potential gains under the mean reversion scenario. The normal approach in calculating stress-based capital requirement is to set potential gains under (sub)scenario's to 0.
Global Federation of Insurance Associations	Global	No	No	GFIA takes the view that the Dynamic Nelson-Siegel (DNS) model should be used.
Dai-ichi Life Holdings, Inc.	Japan	No	No	The "risk-neutral" model should not be used in the calculation of capital requirements. We believes that the DNS model should continue to be used taking into account consistency with other method for measuring market risks.
General Insurance Association of Japan	Japan	No	No	We have no objection with the continued use of the DNS.
The Life Insurance Association of Japan	Japan	No	No	• The "risk-neutral" model should not be used in the calculation of capital requirements. The LIAJ believes that the DNS model should continue to be used taking into account consistency with other method for measuring market risks.
Financial Supervisory Service (FSS) & Financial Services Commission (FSC)	Korea (Republic of)	No	Yes	We believe that the IAIS should consider employing the AFNS model for ICS Version 2.0. Because the DNS model is a pure statistical model, there is room for further improvement to make it theoretically more rigorous in terms of financial economics. To overcome limitations inherent in the DNS model, the AFNS model has been developed to reflect arbitrage-free condition, one of the most fundamental principles of financial economics, into the DNS model. Differently from the common misperception, the term ´arbitrage-free´ in AFNS does not mean that the AFNS model is a risk neutral model. As the DNS model is a real world model, the AFNS model is also a real world model only with advanced theoretical rigorousness to produce more market consistent values. So, to our understanding, there is no problem applying AFNS model in capital requirement calculation. The AFNS model is already well-studied by some researchers, such as Lou and Zhang (2010), Christensen et al. (2011), Ullah (2016), and Caldeira et al. (2016), showing that the AFNS model is theoretically more rigorous than the DNS and is better positioned in forecast performance. Moreover, the AFNS model has been adopted by central banks in some countries including Portugal, Demark, and Switzerland in analyzing their financial markets.

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Aegon NV	The Netherlands	No	No	We prefer the real-world calibration as it uses past data for the calibration, which is similar to how other shocks are calibrated. DNS assumes a shape that might not be correct for all currencies as most research is based on USD, which is why we prefer an alternative model. For interest rate risk in our internal economic capital framework we use principal component analysis, which is able to capture more of the variance in interest rate scenarios.
Legal & General	UK	No	Yes	We would not be averse to this model being considered for use in ICS version 2.0 based on some of the attractive properties that it possesses, but we note that this model appears to be relatively obscure and untested and therefore we would want to see output from a thorough review of the model by IAIS before it was introduced. This should include, as a minimum, backtesting against a number of datasets for various key economies, stability testing against a range of different possible base curves, and a comparison of output against other more established models.
National Association of Mutual Insurance Companies	United States	No	No	NAMIC disagrees with the mandate of a standard method, the 99.5% VaR calibration level and the IAIS dictating the factors to be used in the formula. Jurisdictional flexibility is the appropriate way to capture these risks with mutual recognition and shared understanding of the jurisdictional approach at supervisory colleges.
Prudential Financial, Inc.	United States of America	No	No	We believe that the AFNS model would not be appropriate. Since the AFNS is an arbitrage-free model, it is conceptually suitable for risk-neutral valuation but not for calibrating stresses for purposes of setting a capital requirement. Moreover, given that the AFNS is fitted to an initial yield curve with an additional parameter, resulting interest rate stresses could be less intuitive due to possible overfitting of the model. We believe that the IAIS should continue using the DNS model. However, for the DNS model calibration, longer historical data should be used, where available rather than using data from January 2010 for all currencies.
American Property Casualty Insurance Association (APCI)	USA	No	No	As with several other questions posed in the CD, it is difficult to answer this question without the experience of being a field testing participant.
Property Casualty Insurers Association of America (PCI)	USA	No	No	PCI´s yes or no response was simply required in order to open the text box and file comments. We believe this question to be best addressed by field test volunteers who have

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				the ability to do so with the benefit of actual data for support and context. The absence of a response by PCI should not be taken one way or the other with respect to the subject of the question.

Q105 Section 7.12 Should the IAIS apply the AFNS model to countries where the AFNS model is applicable, and apply the DNS model to the rest of countries? Please explain.

Organisation	Jurisdiction	Confidential	Answer	Answer Comments
China Banking and Insurance Regulatory Commission (CBIRC)	China	No	No	
European Insurance and Occupational Pensions Authority (EIOPA)	EIOPA	No	No	Apart from the fact that it is questionable that the AFNS model would be applicable in some countries and not in others, we believe the IAIS should not further differentiate the interest rate risk approach. This would in our view unnecessarily further complicate the approach and undermine comparability.
Insurance Europe	Europe	No	No	Insurance Europe supports a consistent approach across all jurisdictions.
Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)	Germany - BAFIN	No	No	Apart from the fact that we do not really understand what it means that the AFNS model would be applicable in some countries and not in others, we believe the IAIS should not further differentiate the interest rate risk approach. This would in our view unnecessarily further complicate the approach and undermine comparability.

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Global Federation of Insurance Associations	Global	No	No	GFIA takes the view that the Dynamic Nelson-Siegel (DNS) model should be used.
Dai-ichi Life Holdings, Inc.	Japan	No	No	The "risk-neutral" model should not be used in the calculation of capital requirements. We believes that the DNS model should continue to be used taking into account consistency with other method for measuring market risks.
General Insurance Association of Japan	Japan	No	No	
The Life Insurance Association of Japan	Japan	No	No	• The "risk-neutral" model should not be used in the calculation of capital requirements. The LIAJ believes that the DNS model should continue to be used taking into account consistency with other method for measuring market risks..
Financial Supervisory Service (FSS) & Financial Services Commission (FSC)	Korea (Republic of)	No	Yes	There can be a concern that the AFNS´ theoretical rigorousness (arbitrage-freeness) might cause calibration instability in case market data does not support arbitrage-freeness, especially for small and/or less mature markets. If it is the case, considering the theoretical superiority of AFNS model to DNS model, it would be appropriate to apply the AFNS model to the countries where the AFNS model is applicable and to apply the DNS model to the rest of countries where the AFNS model is not applicable.
Legal & General	UK	No	Yes	We would consider this an acceptable approach, although lack of consistency between countries might be an argument against the AFNS model in the assessment that we set out in our response to question 104.
National Association of Mutual Insurance Companies	United States	No	No	Interest rate risk should be determined by the local jurisdictional supervisor. NAMIC disagrees with the mandate of a standard method, the 99.5% VaR calibration level and the IAIS dictating the factors to be used in the formula. Jurisdictional flexibility is the appropriate way to capture these risks with mutual recognition and shared understanding of the jurisdictional approach at supervisory colleges.
Prudential Financial, Inc.	United States of America	No	No	We believe that the AFNS model would not be appropriate to use for the reasons mentioned in our response to question 104. Also, it is important to apply a consistent interest rate model for all currencies.

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| American Property Casualty Insurance Association (APCI) | USA | No | No | As with several other questions posed in the CD, it is difficult to answer this question without the experience of being a field testing participant. |
| Property Casualty Insurers Association of America (PCI) | USA | No | No | PCI´s yes or no response was simply required in order to open the text box and file comments. We believe this question to be best addressed by field test volunteers who have the ability to do so with the benefit of actual data for support and context. The absence of a response by PCI should not be taken one way or the other with respect to the subject of the question. |

> **Q106 Section 7.12 Should the IRR stress on LTFR and the maximum LTFR annual change for current estimate valuation purposes continue to be independently determined by the IAIS, or should both be subject to the same cap? Please explain with sufficient detail and rationale.**

Organisation	Jurisdiction	Confidential	Answer	Answer Comments
China Banking and Insurance Regulatory Commission (CBIRC)	China	No	Subject to the same cap	
European Insurance and Occupational Pensions Authority (EIOPA)	EIOPA	No	Others	We do not think the same caps have to be applied because of consistency arguments. The 10% stress to the LTFR is a capital requirement, which aims to capture the potential loss in capital resources due to adverse changes in interest rates also in extreme scenarios (99,5% VaR). The stress to the LTFR level reflects the fact that also long term interest rates can change, and hence can adversely affect capital resources. The cap to the annual LTFR change of 15bps per year at the other hand is to safeguard some level of stability in the valuation of liabilities, which is one of the aims the IAIS tries to achieve with the LTFR-methodology. Given these different objectives we believe the caps do not necessarily need to be aligned. Finally, as already mentioned in the consultation document, currently the

				calibration of ICS shocks for any risk drivers is not in constrained by the assumptions used to calculate the current estimates.
Insurance Europe	Europe	No	Subject to the same cap	The capital requirement for the IRR represents the losses to which the insurer is exposed due to unexpected changes in the level or volatility of interest rates over a one year period. For the calculation of the IRR capital charge to be economically correct, the stress on the LTFR and the maximum annual LTFR change must be consistent. If they are different, then the capital requirement for interest rate risk will not correctly reflect the change in capital resources which would occur if the stress event materialised. Insurance Europe further questions what the justification would be for having independent calibrations for these components of the framework? The consultation notes that the shocks for risk drivers are not in any way constrained by the assumptions used to calculate the current estimates. However, this is contradictory to provision 17.14.8 of ICP17 which provides guidance on for insurers using an internal model to calculate regulatory capital requirements and states that "The methodology should also be consistent with the methods used to calculate technical provisions". Making the stress of the LTFR consistent with the maximum annual changes of the LFTR would ensure improved consistency between the ICS v2.0 and ICP 17.
Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)	Germany - BAFIN	No	Others	We do not think the same caps have to be applied because of consistency arguments. The 10% stress to the LTFR is a capital requirement, which aims to capture the potential loss in capital resources due to adverse changes in interest rates also in extreme scenarios (99,5% VaR). The stress to the LTFR level reflects the fact that also long term interest rates can change, and hence can adversely affect capital resources. The cap to the annual LTFR change of 15bps per year at the other hand is to safeguard some level of stability in the valuation of liabilities, which is one of the aims the IAIS tries to achieve with the LTFR-methodology. Given these different objectives we believe the caps do not necessarily need to be aligned. Finally, as already mentioned in the consultation document, currently the calibration of ICS shocks for any risk drivers is not in any way constrained by the assumptions used to calculate the current estimates.
Dai-ichi Life Holdings, Inc.	Japan	No	Subject to the same cap	The risk charge should accurately capture the risk of capital reduction over a one-year time horizon. Therefore, the IRR stress on LTFR and the maximum LTFR annual change should both be subject to the same cap.

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General Insurance Association of Japan	Japan	No	Independently determined by the IAIS	Whereas the purpose of the IRR stress on LTFR is to measure risks that manifest once in 200 years, the purpose of setting a cap on maximum LTFR annual change is to improve stability (mitigate excessive volatility) of insurance liabilities. Since they have different objectives, we do not think the cap should necessarily be aligned.
The Life Insurance Association of Japan	Japan	No	Independently determined by the IAIS	
Financial Supervisory Service (FSS) & Financial Services Commission (FSC)	Korea (Republic of)	No	Subject to the same cap	The LTFR is not an observed but a conceptual interest rate. The LTFR should not be changed because its stability is very important. Even if the IRR stress is applied on the LTFR, the IRR stress on the LTFR and the maximum LTFR annual change for the current estimate valuation purposes should be subject to the same cap.
Aegon NV	The Netherlands	No	Others	The stress approach should be consistent with the reporting framework. Because the framework employs a fixed, long term forward rate, the stress approach should retain the same long-term rate. The yield curve extrapolation should be redrawn from the last liquid point to the long term forward rate. Shocking the LTFR overstates the actual exposure observed when interest rates move and, as such, leads to misalignment of the required capital and the variance observed.
Legal & General	UK	No	Subject to the same cap	This would seem to give the closest match to the way that a risk-free rates stress would be reflected in a post-stress ICS balance sheet. We do not see any argument for not imposing this consistency.
Association of British Insurers	United Kingdom	No	Subject to the same cap	The capital requirement for the IRR represents the losses to which the insurer is exposed due to unexpected changes in the level or volatility of interest rates over a one-year period. For the calculation of the IRR capital charge to be economically correct, the stress on the LTFR and the maximum annual LTFR change must be consistent. If they are different, then the capital requirement for interest rate risk will not correctly reflect the change in capital resources that would occur if the stress event materialised. The consultation notes that the shocks for risk drivers are not in any way constrained by the

				assumptions used to calculate the current estimates. However, this is contradictory to provision 17.14.8 of ICP 17, which provides guidance for insurers using an internal model to calculate regulatory capital requirements: "The methodology should also be consistent with the methods used to calculate technical provisions". Making the stress of the LTFR consistent with the maximum annual changes of the LFTR would ensure improved consistency between the ICS v2.0 and ICP 17.
National Association of Mutual Insurance Companies	United States	No	Others	Interest rate risk should be determined by the local jurisdictional supervisor. NAMIC disagrees with the mandate of a standard method, the 99.5% VaR calibration level and the IAIS dictating the factors to be used in the formula. Jurisdictional flexibility is the appropriate way to capture these risks with mutual recognition and shared understanding of the jurisdictional approach at supervisory colleges.
Prudential Financial, Inc.	United States of America	No	Subject to the same cap	We believe that there should be no IRR stress on the LTFR (i.e., keep the LTFR constant under the interest rate stresses). This approach would be consistent with the long-term definitional nature of LTFR and recognize that LTFRs would likely not be updated following one year of extreme interest rate moves. Rather, LTFR updates would be more likely following a prolonged period of rate changes. If the LTFR continues to be subject to a stress, then the stress should be capped at no more than the maximum LTFR annual change (+/- 15 bps).
Property Casualty Insurers Association of America (PCI)	USA	No	Others	We believe this question to be best addressed by field test volunteers who have the ability to do so with the benefit of actual data for support and context. The absence of a response by PCI should not be taken one way or the other with respect to the subject of the question.
National Association of Insurance Commissioners (NAIC)	USA, NAIC	No	Subject to the same cap	There is no particular theoretical reasoning for that particular capping method. Nevertheless it makes practical sense to have some sort of cap to avoid sharp movements in the LTFR. Large LTFR changes would be against the spirit of a relatively stable long term rate. The suggested capping mechanism appears not unreasonable.

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> Q107 Section 7.12 Is the method used to aggregating the Interest Rate risk in multiple currencies appropriate? If "no", please suggest an alternative methodology.

Organisation	Jurisdiction	Confidential	Answer	Answer Comments
China Banking and Insurance Regulatory Commission (CBIRC)	China	No	Yes	
European Insurance and Occupational Pensions Authority (EIOPA)	EIOPA	No	Yes	
Insurance Europe	Europe	No	No	Insurance Europe does not believe that the IAIS's proposed aggregation method is appropriate, as correlations between interest rate risks in different economies will not be dependent on any IAIG's net long or short position in that currency. Any correlation should be based on observed market data, independent of insurance groups' exposures. The correlation factor is also too onerous. Market data suggest that the correlation for interest rate risks between currencies is low. No limits in offsetting interest rate stress impacts in one currency against another currency should be applied.
German Insurance Association	Germany	No	No	This comment relates to the formula in 334 for combining the stresses. For a capital requirement the worst case impact of a series of interest rate scenarios should be chosen. A combination of the impacts of several different scenarios is inappropriate, as it does not reflect any real actually possible economic outcome. Additionally it provides wrong incentives for risk management due to the artificial combination of stress results. No limits in offsetting interest rate stress impacts in one currency against another currency should be applied.

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Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)	Germany - BAFIN	No	Yes	An alternative methodology could be to fix the scenario and to sum over all currencies in the corresponding scenario to come up with a capital charge for that scenario.
Global Federation of Insurance Associations	Global	No	No	The interest rate risk charges for each currency are aggregated using a correlation matrix, using a 75% correlation between each pair of currencies that have net long or net short duration in both currencies, and a negative 75% correlation in each pair of currencies for which one of the durations is net long and the other is net short. GFIA takes the view that this method is not appropriate, as correlations between interest rate risks in different economies will not be dependent on any insurance groups' net long or short position in that currency. Any correlation should be based on observed market data, independent of insurance groups' exposures. The correlation factor is also too onerous. Market data suggests that the correlation for interest rate risks between currencies is low.
Dai-ichi Life Holdings, Inc.	Japan	No	Yes	
General Insurance Association of Japan	Japan	No	No	The proposed method aggregates the maximum IRR for each currency. As a result, the risk to insurers with convexity risk is valued as smaller compared with those without. Also, insurers' required capital would be sensitive to the reversal of long and short positions, resulting in instability. For example, when risk in currency A is 120 for a long position and 100 for a short position, and risk in currency B is 100 for a short position, the risk of currency A (long 120) and B (short 100) will be aggregated with the correlation factor of -0.75. This would be smaller than the risk of currency A (short 100) and currency B (short 100) being aggregated with the correlation factor of +0.75. Therefore, we believe the current method should be revised. One alternative method would be to calculate the interest rate upward stress (sqrt(UP^2 + max(twist1,twist2)^2)) and downward stress (sqrt(DOWN^2 + max(twist1,twist2)^2)) for each currency, and apply the largest of the (1)～(3) below. (1) the risk amount aggregated by the upward risks of each currency with the correlation factor of 0.75 (2) the risk amount aggregated by the downward risks of each currency with the correlation

				factor of 0.75 (3) the risk amount calculated by current method
Financial Supervisory Service (FSS) & Financial Services Commission (FSC)	Korea (Republic of)	No	No	In case of other risks like equity risk, real estate risk, credit risk, etc, diversification between currencies is not being recognised. This just complicates the standard model considering the benefits.
Aegon NV	The Netherlands	No	No	The proposed method ignores historical observations. The correlations between interest rates in different currencies are not affected by whether a single insurance company is net long or net short to those particular currencies. Ideally, we would like to see a correlation structure that is based on real world observations.
Legal & General	UK	No	Yes	We are comfortable with this.
Association of British Insurers	United Kingdom	No	No	The interest rate risk charges for each currency are aggregated using a correlation matrix, using a 75% correlation between each pair of currencies that have net long or net short duration in both currencies, and a negative 75% correlation in each pair of currencies for which one of the durations is net long and the other is net short. The ABI believes that this method is not appropriate, as correlations between interest rate risks in different economies will not be dependent on any insurance groups' net long or short position in that currency. Any correlation should be based on observed market data, independent of insurance groups' exposures. The correlation factor is also too onerous. Market data suggests that the correlation for interest rate risks between currencies is low.
National Association of Mutual Insurance Companies	United States	No	No	Interest rate risk should be determined by the local jurisdictional supervisor. NAMIC disagrees with the mandate of a standard method, the 99.5% VaR calibration level and the IAIS dictating the factors to be used in the formula. Jurisdictional flexibility is the appropriate way to capture these risks with mutual recognition and shared understanding of the jurisdictional approach at supervisory colleges.

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Prudential Financial, Inc.	United States of America	No	Yes	
American Property Casualty Insurance Association (APCI)	USA	No	No	As with several other questions posed in the CD, it is difficult to answer this question without the experience of being a field testing participant.
Property Casualty Insurers Association of America (PCI)	USA	No	No	PCI´s yes or no response was simply required in order to open the text box and file comments. We believe this question to be best addressed by field test volunteers who have the ability to do so with the benefit of actual data for support and context. The absence of a response by PCI should not be taken one way or the other with respect to the subject of the question.

Q108 Section 7.12 Is the treatment of management actions and the current choice of scenarios based on impact before the management actions within the Interest Rate risk charge appropriate? If "no", please explain with sufficient detail and rationale.

Organisation	Jurisdiction	Confidential	Answer	Answer Comments
China Banking and Insurance Regulatory Commission (CBIRC)	China	No	Yes	
European Insurance and Occupational Pensions Authority (EIOPA)	EIOPA	No	Yes	
Insurance Europe	Europe	No	No	The scenario should be chosen based on the impact after management actions (eg with changed future discretionary benefits) as this provides a better reflection of economic reality.

German Insurance Association	Germany	No	No	The scenario should be chosen based on the impact after management actions (e. g. with changed future discretionary benefits, FDB). The calculation after management actions is the one which reflects economic reality (in fact, FDB may change automatically if it is linked to changed capital income).
Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)	Germany - BAFIN	No	Yes	
Dai-ichi Life Holdings, Inc.	Japan	No	Yes	
Financial Supervisory Service (FSS) & Financial Services Commission (FSC)	Korea (Republic of)	No	Yes	
Legal & General	UK	No	No	We believe that the capital and the biting direction of stress should be consistently calculated on the basis of scenarios losses net of any assumed management actions.
National Association of Mutual Insurance Companies	United States	No	No	Interest rate risk including the treatment of management actions and scenarios should be determined by the local jurisdictional supervisor. NAMIC disagrees with the mandate of a standard method, the 99.5% VaR calibration level and the IAIS dictating the factors to be used in the formula. Jurisdictional flexibility is the appropriate way to capture these risks with mutual recognition and shared understanding of the jurisdictional approach at supervisory colleges.
Prudential Financial, Inc.	United States of America	No	No	We believe that the stress impact on the IAIG's assets and liabilities after management actions should be evaluated for each scenario instead of the two-step approach where 1. the binding scenarios are identified before management actions are applied and 2. management actions are then only applied to the binding scenarios (instead of all stresses).
Northwestern Mutual	USA	No	No	Discretionary benefits should always be linked to the specific scenario, as it would be in practice. Adjusting discretionary benefits as a separate step, not linked to a specific

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				scenario, would create unrealistic results and it would be difficult to evaluate the reasonableness of the adjustment.
Property Casualty Insurers Association of America (PCI)	USA	No	No	PCI´s yes or no response was simply required in order to open the text box and file comments. We believe this question to be best addressed by field test volunteers who have the ability to do so with the benefit of actual data for support and context. The absence of a response by PCI should not be taken one way or the other with respect to the subject of the question.

Q109 Section 7.12 Are there any further comments on Interest Rate risk that the IAIS should consider in the development of ICS Version 2.0? If "yes", please explain with sufficient detail and rationale.

Organisation	Jurisdiction	Confidential	Answer	Answer Comments
CLHIA	Canada	No	Yes	Our view is the current ICS approach is very restrictive and prescriptive. A principle based approach would be preferred. In practice, arbitrary factors should be avoided and instead market data should form the basis for calculation inputs. While this will require ongoing calibration, it makes far more sense than static factors. As an example, to calculate a market observed yield for the liquid segment, {Swaps – 10bps} could be replaced with {Swaps – long term average swap spread specific to currency/term}, and the 75% correlation should be replaced by a calculated correlation from market data.
China Banking and Insurance Regulatory Commission (CBIRC)	China	No	Yes	From last two years' field testing results, the interest rate shocks generated by using the same model for the RMB interest rates are very different, indicating that the existing model may be too much affected by the short-term (one-year) interest rate experience. This may bring great difficulties to the insurers in capital management. The purpose of ICS is to help insurers to better identify risks and manage capitals. When there is no major change in the

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				market environment, interest rate shocks should not change significantly. We suggest this be resolved before the ICS 2.0 enters the monitoring period.
European Insurance and Occupational Pensions Authority (EIOPA)	EIOPA	No	Yes	As already mentioned in response to question 104 we doubt the appropriateness of allowing the recognition of a gain in the mean reversion scenario.
Insurance Europe	Europe	No	Yes	Insurance Europe notes that changes in interest rates constitute a single risk. This risk may be modelled in a more simple and robust way with only one risk factor or in a more sophisticated way with two risk factors (1st and 2nd principal component if PCA is applied) within the same scenario. However, in both cases, there should be only one downward scenario (respectively. one combined downward and flattening scenario). IRR design makes inputs and outcomes hard to be understood and interpreted. The resulting overall capital charge is hard to challenge. For example, regarding euro-currency shock, there are evidences, raising from supervisor works, that the capital charge for IRR should be lower. For a capital requirement, the worst case impact of a series of interest rate scenarios should be chosen. A combination of the impacts of several different scenarios is inappropriate, as it does not reflect any real actually possible economic outcome. This creates difficulties in assessing and communicating this risk and provides wrong incentives for risk management due to the artificial combination of stress results. In addition, according to the technical specifications the interest rate shocks appear to be derived using a normal distribution, which may not be appropriate. This assumes symmetry between the level up and down shock, which is not consistent with the observed market data. Compared to work performed using market data, the current ICS approach significantly understates the upward stress and significantly overstates the downward stress for a number of key currencies.
Allianz	Germany	No	Yes	The method used to combine worst-case shock combinations per currency to calibrate overall interest rate risk is unrealistic and limits the impact of offsetting strategies taken for risk management purposes and which are at the core of Asset-Liability management.

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				The ICS capital requirement is based on a mathematical combination of scenarios that mutually exclusive - twist up (down) and up (down) - and for the aggregation of different currencies a mechanistic and artificial approach that limits the off-setting of profits/losses between currencies is applied that does not reflect reality.
German Insurance Association	Germany	No	Yes	Changing interest rates constitute a single risk. This risk may be modelled in a more simple and robust way with only one risk factor or in a more sophisticated way with two risk factors (1st and 2nd principal component if PCA is applied) within the same scenario. However, in both cases, there should be only one downward scenario (resp. one combined downward and flattening scenario).
Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)	Germany - BAFIN	No	Yes	As already mentioned in response to question 104 we doubt the appropriateness of allowing the recognition of a gain in the mean reversion scenario.
Global Federation of Insurance Associations	Global	No	Yes	Changing interest rates constitutes a single risk. This risk may be modelled in a more simple and robust way with only one risk factor or in a more sophisticated way with two risk factors (1st and 2nd Principal Components if PCA is applied) within the same scenario. However, in both cases, there should be only one downward scenario (respectively one combined downward and flattening scenario). The current derivation of interest rate shocks is overly complex. Moreover, according to the technical specification, the interest rate shocks look to be derived using a normal distribution, which may not be appropriate. It assumes symmetry between the level up and down shock, which is not consistent with the observed market data. Compared to work performed using market data, the current ICS approach significantly understates the upward stress and significantly overstates the downward stress for a number of key currencies, such as USD. GFIA would encourage IAIS to consider an alternative.
International Actuarial Association	International	No	Yes	The instructions for calculating the interest rate risk charge under the GAAP Plus approach ignore the property/casualty insurance situation under US GAAP. The net result is an invalid approach for measuring what is essentially a contingent risk based on possible liquidity needs.

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				To begin with, the Technical Specifications in section 13.4.1.3 discuss situations where liabilities are discounted using portfolio returns, and where the liabilities are discounted using market yield curves. That section also discusses the situation where assets are held at amortized cost. There is no discussion concerning the situation for most property/casualty companies under US GAAP, where liabilities are not discounted, but assets are held at market. (NOTE : For US GAAP, most property/casualty companies classify their fixed income investments as « available for sale », or « AFS ». For these securities, the values reported on the balance sheet are based on market values, which do fluctuate with changes in interest rates.) As a result of the above, an interest rate change under US GAAP for a property/casualty insurer will typically result in a material change in asset values, but no change in liability values. This does not impact solvency-related capital, as that is based on US Statutory accounting where investment grade assets are held at amortized cost (and amortized cost is not impacted by interest rate changes) and liabilities are not discounted or are discounted at a fixed rate. The situation described above for US GAAP also does not impact most users of US GAAP, as a common adjustment made by investment analysts in reviewing US GAAP financial statements for property/casualty companies is to adjust the financial reports for changes in unrealized gains (e.g., those due to interest rate movements). The Insurance Regulation Committee of the IAA suggests that the IAIS may also want to consider the results of company internal models at similar assumed stress levels to gain insight on the current calibration. Lastly, we expect there may exist other issues within other local GAAPs, but have not been able to document them within the time needed for this response.
Dai-ichi Life Holdings, Inc.	Japan	No	Yes	For life insurers that hold ultra-long duration liabilities, interest rate risk will be realised over time as a result of future decline in reinvestment yields. Life insurers can improve their financial soundness by acquiring new contracts and efforts to reduce costs. As for interest rate risk, We would like the IAIS to consider the possibility of supervisory actions and intervention measures taking into account the ability of life insurers to address such risks

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				over time. In addition to the above, we recommend the IAIS to consider the impacts on each jurisdiction including the impacts of insurer's investment behaviour on the financial market and the possibility of limitation about providing insurance products.
General Insurance Association of Japan	Japan	No	Yes	(Firstly, we repeat our opening comment on Q71) There are cases where insurers set a target interest rate hedge ratio (interest sensitivity of asset/interest sensitivity of liability) to mitigate interest rate risks and continuously rebalance their investments so that the ratio falls within a certain range. In such cases, we reflect this interest rate hedge strategy by reflecting the rebalancing of hedge ratio to 1 year continuous interest rate change in Monte-Carlo simulation of the internal model. While we would like to reflect the effect of interest rate risk mitigation, it is difficult to incorporate such practices within the standard method. Therefore, ICS interest rate risks should allow for the effect of interest rate hedging through, for example, the application of factors. The ICS standard method does not capture the risk of fluctuation in the implied volatility to be used to assess the time value of surety and option. Considering that such risk may be material for some IAIGs, a method taking into account the fluctuation of implied volatility should be considered. Such a method should be simplified to the extent possible and avoid being burdensome for IAIGs. The ICS standard method does not include the risk margin (MOCE) in the measurement of interest rate risks. When appropriate, a method to measure the interest rate risk that reflects the risk margin should be available, for example when the risk margin has large sensitivity to interest rate fluctuation.
The Life Insurance Association of Japan	Japan	No	Yes	• For life insurers that hold ultra-long duration liabilities, interest rate risk will be realised over long time as a result of decline in reinvestment yields in future. Life insurers can improve their financial soundness by acquiring new contracts and efforts to reduce costs during this period. As for interest rate risk, the LIAJ would like the IAIS to consider the possibility of supervisory actions and intervention measures taking into account the ability of life insurers to address such risks over time.

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				• In addition to the above, the LIAJ recommends the IAIS to consider the impacts on each jurisdiction taking into account that change of investment behaviour of life insurers can cause a big impact on financial markets, and insurers might be forced to narrow their range of products.
Financial Supervisory Service (FSS) & Financial Services Commission (FSC)	Korea (Republic of)	No	No	
American Council of Life Insurers	Office of General Counsel	No	Yes	Our comments are in regards to the five scenarios used to measure the interest rate risk. We believe the strength of the interest rate risk charge is excessive and should be lowered. The interest rate risk charge in ICS version 2.0 is substantially higher than it was in 2017, and it is also higher than the same risk charge in Solvency II. We believe that the excessive interest rate charge results in a calibration that is greater than the intended 99.5 percentile strength. Similarly, we believe the interest "down shock" is excessive as well. Of particular concern is the magnitude of the shock applied beyond the last observable tenor, which is excessive and highly punitive for insurers with long-dated liabilities; the shock does not appropriately reflect life insurer's true exposure to interest rate risk which is to the potential for gradual reinvestment at lower rates over an extended period of time. When compared against Solvency II, the ICS version 2.0 interest rate "down shock" is much more severe. We also believe that the consultation does not provide justification for including the second component of the IRR shock, a twist shock, on top of either the down or up shock. Instead, we recommend that the up, down and twist shock should be evaluated and the worst of the three selected as the interest rate risk shock. Further, because the twist shocks are extrapolated to the same long-term forward rate, the tail stresses do not represent statistically independent components. Therefore, it is not appropriate to combine these stresses with the results of the up or down shock.
The Life Insurance Association of the Republic of China	CHINESE TAIPEI	No	Yes	☐No shock on LTFR would be more appropriate 1. The LTFR represents an interest rate to be earned when the market reaches its long-term

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				equilibrium and therefore should be immune to the short-term market fluctuation.
				LTFR is designed as a long-term rate to be earned when market is in equilibrium, implying its stability in nature. That is, the LTFR should not be affected by the short-term market movements. On the other hand, without solid calibration, the shock level on LTFR would still be challenged and hard to be convincing.
				2. Expected real interest rates are derived from the long-term averages and the annual variation should be minor.
				Expected real interest rates are derived from past 20-year or 45-year average of real interest rates. The variation of annual real interest rates would then contribute little to the average real interest rates. Based on the current 10% shock on LTFR, where the post-shocked LTFR lowers down from 3.8% to 3.42%. With the inflation target remains the same, the average real rates should be down to 1.42% from 1.80%. As the current 1.80% real interest rate of DMs is the 56-year average, the 0.38% decrease of the average would all be contributed from the newly-added 57th year real interest rate. In other words, only if the most recent real interest rate is -20% can result in the 0.38% drop of average real rate. However, there may be no such record historically.
				☐Suggest relative shock approach under interest rate risk module.
				1. We suggest calibration based on relative shock method.
				Under the same methodology, shock levels derived from relative $((r(t)-r(t-1))/r(t))$ and absolute $((r(t)-r(t-1))$ shock substantially differ. We have observed relative and absolute shock magnitude under Principal Component Analysis (PCA) for TWD with calibration period of 2010~2017. The shock magnitude $(\Delta r/r)$ under the relative shock magnitude is 42.2%, significantly lower than 61.7% under the absolute shock.
				2. The back-testing on the NTD interest rate shock level indicates the over-prudent calibration and there is no empirical evidence ever to the extent of losses given the prescribed shock magnitude.

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<table>
<tr><td></td><td></td><td></td><td></td><td>Historically Chinese Taipei has no negative interest rate introduced. Under the 2018FT interest rate risk, the shock on the 10 year risk-free rate of NTD is as much as -103.9%, resulting the post-shocked 10-year risk-free rate to be negative. However, the empirical data shows that the prescribed shock level has exceeded the historical annual change of 10-year risk-free rates, -49%, of the same period, indicating the over-prudent calibration on the current ICS TWD interest rate risk. We suggest revisiting the approach to adequately capture the interest rate risk.

3. The current interest rate risk is developed on the ground of absolute shock approach. To avoid the pro-cyclical effect, we suggest using relative shock approach.

Along with the change of economic structure, many jurisdictions have entered the low interest rate era. The fact that a lower capital requirement in a lower yield environment should be considered. Observing the current ICS downward shock on TWD (calibration period : 2010/3/8~2017/12/29, daily data), the 10 years risk free rate is down from 1.03% pre-shock to -0.04% post-shock, meaning the absolute change is as much as 1.07%. However, it can be observed that the absolute annual changes in low yield environment exhibit different levels as compared to the high yield environment. Based on the historical data, 2% of the annual changes exceed 1% while 19% of the annual changes are below -1% in the high and moderate yield environment (Period I: 1999~2009), where the average yield is 3.2%. On the other hand, 0% of annual absolute changes exceed 1% in the low yield environment (Period II: 2010~2017), where average yield is 1.4%. We deem the current shock magnitude fails to reflect the dynamic shock with respect to the different yield environment and we suggest using relative approach which is similar to the approach under Solvency II. Under the relative approach, the pro-cyclical effect can be prevented and interest rate risk can be appropriately captured.</td></tr>
<tr><td>Aegon NV</td><td>The Netherlands</td><td>No</td><td>Yes</td><td>To create clarity, the interest rate model should include the following components very explicitly:

• How the shock should be applied to the valuation of assets</td></tr>
</table>

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				• Whether the MOCE should also be shocked if it were to be a balance sheet item in the ultimate design Another element we would like to highlight once more is the inconsistency between having a stable LTFR and stressing this LTFR, as indicated in Q106.
Legal & General	UK	No	Yes	Our further comments are as follows: • We are not convinced of the logic behind including an element of mean reversion within the capital calculation. We do not believe that it is consistent with the one year time horizon to assume (as specified in 2018 field testing) that pre-stress rates "snap back" to a long-term average before then undergoing a further stress. Under certain base interest rate conditions this could lead to a very significant stress and this is an important issue for us. We are also unclear as to why the magnitude of the mean reversion stress would have increased since the 2017 field testing given in our view risk-free rates moved closer to what we would consider a long-term average over 2017. • We believe that the current construction of the interest rate module is overly complex for a simplified standard formula approach to capital. • In terms of the actual stresses themselves (without the mean reversion element) we are broadly comfortable with the strength of the calibration.
Association of British Insurers	United Kingdom	No	Yes	The current derivation of interest rate shocks is overly complex. Moreover, according to the technical specification, the interest rate shocks look to be derived using a normal distribution, which may not be appropriate. It assumes symmetry between the level up and down shock, which is not consistent with the observed market data. Compared to work performed using market data, the current ICS approach significantly understates the upward stress and significantly overstates the downward stress for a number of key currencies, such as USD. The ABI would encourage IAIS to consider an alternative.

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National Association of Mutual Insurance Companies	United States	No	Yes	The ICS is not yet fit for purpose. Significant additional work is needed to achieve an appropriate global capital standard and it may be completely unachievable. Interest rate risk and all other risks and their factors should be determined by the local jurisdictional supervisor. NAMIC disagrees with the mandate of a standard method, the 99.5% VaR calibration level and the IAIS dictating the factors to be used in the formula. Jurisdictional flexibility is the appropriate way to capture these risks with mutual recognition and shared understanding of the jurisdictional approach at supervisory colleges.
American Academy of Actuaries	United States of America	No	Yes	The instructions for calculating the Interest Rate risk charge under the GAAP Plus approach ignores the property/casualty insurance situation under U.S. GAAP. The net result is an invalid approach for measuring what is essentially a contingent risk based on possible liquidity needs. To begin with, the Technical Specifications in section 13.4.1.3 discusses situations where liabilities are discounted using portfolio returns, and where the liabilities are discounted using market yield curves. That section also discusses the situation where assets are held at amortized cost. There is no discussion concerning the situation for most property/casualty companies under U.S. GAAP, i.e., where liabilities are not discounted but assets are held at market value. (NOTE: For U.S. GAAP, most property/casualty companies classify their fixed income investments as "available for sale", or "AFS." For these securities, the values reported on the balance sheet are based on market value, which does fluctuate with changes in interest rates.) As a result of the above, an interest rate change under U.S. GAAP for a property/casualty insurer will typically cause a material change in asset value, but no change in liability value. This does not impact solvency-related capital, as that is based on U.S. statutory accounting where investment grade assets are held at amortized cost (and amortized cost is not impacted by interest rate changes) and liabilities are not discounted or are discounted at a fixed rate. The situation described above for U.S. GAAP also does not impact most users of U.S. GAAP, as a common adjustment made by investment analysts in reviewing U.S. GAAP financial statements for property/casualty companies is to adjust the financial reports for changes in unrealized gains (e.g., those due to interest rate movements). Note that, from a property/casualty perspective, an interest rate change does not result in a

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				change in projected cash flows unless a fixed income asset must be sold before maturity. Hence the interest rate risk calculation results in an item not relevant to property/casualty solvency risk (i.e., the risk that an insurer will not be able to meet policyholder obligations when they become due), unless the risk of a liquidity deficiency is also incorporated into the measurement. In fact, the interest rate risk charge as currently structured encourages companies to increase their solvency risk, as it produces lower risk charges for holding cash that generates no income, and higher risk charges for investing in fixed income assets with durations equal to liability durations (i.e., such that projected cash flows are positive for the liability payout period). From a life insurance perspective, it will be critical to ensure that the interest rate risk charge is appropriately calibrated to the target 99.5 percent VaR over a one-year time horizon. This is especially true when calculating the Interest Rate risk charge on liabilities with long duration guarantees. The IAIS may want to consider the results of company internal models at similar assumed stress levels to gain insight on the current calibration.
Prudential Financial, Inc.	United States of America	No	Yes	Tail Stress Modulation - The IAIS should apply a stress after the last point of Segment 1 of the yield curve however, the current approach is overly punitive and requires the following modification: Downward and upward tail stresses (i.e., shocks beyond the investable horizon) should be modulated to reflect the reduced relevance of short-term rate moves to the expected cost of asset and liability matching of tail cash flows since this matching will occur many years in the future as they roll into the investable horizon. The insurance industry's ALM disciplines typically use duration positioning within investment portfolios to mitigate interest rate risk where it is possible to do so within the investable horizon. To appropriately capture the result of these ALM disciplines, it is critical that yield curve stresses beyond the investable horizon appropriately reflect the way interest rate risks manifest for life insurers relative to their very long-dated "tail" liability cash flows. Our recommended approach to modulate the tail shocks is:

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				+ Keep the Long-Term Forward Rate (LTFR) constant under the interest rate stresses (versus shocking LTFR by +/- 10% for upward/downward stresses) to reflect the long-term definitional nature of LTFR, and + Apply a haircut based on an "Information Ratio" to the tail stresses to reflect the reduced relevance to insurers' ALM strategy. The Information Ratio adjustment measures the observed quality of forward rates in predicting where future 10-year Treasury rates will be 1 year from now and 20 years from now. Based on our analysis, forward rates tell us very little about where rates will actually be 20 years from now or at the time a typical "tail" liability becomes hedgeable. + Tail modulation can be set 20 years beyond the end of the investable tenors. Linear grading from the end of the investable horizon ensures that as tail cash flows approach the point at which they will be hedged, they will be subject to increasing levels of shock, such that a year 31 cash flow in the tail will receive a nearly identical shock to the year 30 cash flow in the investable horizon. + Prudential Financial has previously shared a detailed proposal on how the IAIS can incorporate the tail shock modulation concept into the ICS and would be happy to have further conversations with the IAIS on this subject. Flattening and Steepening Stresses - We believe that the tail stress of the flattener should be removed. Since both the downward and flattening stresses are extrapolated to the same LTFR, the tail stresses do not represent statistically independent components and therefore should not be combined. For the same reason, the tail stress within the steepening stress should also be removed. Treatment of External Debt - External debt should not be subject to interest rate stresses. Debt is a source of capital and should be viewed differently than insurance liabilities. Declining rates would lower the refinancing cost of debt capital, which would be beneficial to an insurer.

MetLife, Inc	USA	No	Yes	The ICS Interest Rate Risk charge is excessive compared to Solvency II and markedly higher than the 2017 charge. This implies that the calibration is in excess of the 99.5th percentile. Similarly, the ICS interest rate down shock is much larger compared with Solvency II. The ICS shock is further amplified by an additional twist shock that is not required by Solvency II. We suggest adjustment consistent with analysis of historical data.
Property Casualty Insurers Association of America (PCI)	USA	No	Yes	PCI´s yes or no response was simply required in order to open the text box and file comments. We believe this question to be best addressed by field test volunteers who have the ability to do so with the benefit of actual data for support and context. The absence of a response by PCI should not be taken one way or the other with respect to the subject of the question.
Actuarial Institute of Chinese Taipei, AICT	Chinese Taipei	No	Yes	Removal of 10% shock on LTFR LTFR represent long term market equilibrium return which is stable in nature and should immune from short-term market fluctuation. In addition, with the lack of solid calibration of LTFR stress level, it would also lead to inappropriate result. As the expected real interest rates were derived from past 20 year or 45 year average real interest rate, change to average real interest rate due to movement in the annual real interest rate is expect to be minimum. Currently, real interest rate of 1.8% for DMs is calibrated based on a 56 year average, apply 10% shock to LTFR resulted in a 0.38% drop in average real interest rate. The resultant 0.38% imply a -20% real rate in the coming year which is improbable and was not observed in any historical record. Proposal of relative shock approach for interest rate risk module Apply the same methodology, shock levels derived from relative $((r(t)-r(t-1))/r(t))$ and absolute shock $((r(t)-r(t-1))$can differ substantially. Under Principal Component Analysis (PCA) for TWD with calibration period of 2010~2017, the shock magnitude applying relative shock approach is significantly lower than applying absolute shock. The shock magnitude $(\Delta r/r)$ was 42.2% under relative shock and 61.7% for absolute shock.

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				Under the 2018FT interest rate risk, the shock on the 10 year risk-free rate of NTD is -103.9%, resulting in a negative risk-free rate, which has never occurred to Chinese Taipei in the past. Empirical data shows that the prescribed shock level has exceeded the historical annual change of 10-year risk-free rates, -49%, of the same period, indicating the over-prudent calibration on the current ICS TWD interest rate risk and hence suggest that adjustments are necessary in correcting such phenome. Along with the change of economic structure, many jurisdictions have entered into low interest rate era. The fact that a lower capital requirement in a lower yield environment should be considered. Observing the current ICS downward shock on NTD (calibration period : 2010/3/8~2017/12/29, daily data), the 10 years risk free rate is down from 1.03% pre-shock to -0.04% post-shock, meaning the absolute change is as much as 1.07%. However, it can be observed that the absolute annual changes in low yield environment exhibit different levels as compared to the high yield environment. Based on the historical data, 2% of the annual changes exceed 1% while 19% of the annual changes are below -1% in the high and moderate yield environment (Period I: 1999~2009), where the average yield is 3.2%. On the other hand, 0% of annual absolute changes exceed 1% in the low yield environment (Period II: 2010~2017), where average yield is 1.4%. We deem the current shock magnitude fails to reflect the dynamic shock with respect to the different yield environment and we suggest using relative approach which is similar to the approach under Solvency II. Under the relative approach, the pro-cyclical effect can be prevented and interest rate risk can be appropriately captured.

End of Section 7.12